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OMAGA: the 2009-2010 French registry on myocarditis

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On behalf of the Working Group on Cardiomyopathies and Heart Failure of Société Française de Cardiologie and of the Société de Réanimation de Langue Française

Background: Acute myocarditis (AM) is a rare and potentially lethal condition for which diagnosis and treatment remain challenging. The recent H1N1 flu pandemic was an opportunity to improve our knowledge about this pathology.

Methods: Since October 2009, we have prospectively enrolled patients diagnosed with AM from intensive care units and cardiology departments in France using the following criteria : anatomo-pathological proof of AM OR presence of infectious context and >1 cardiac symptom and abnormal troponin level and abnormal ECG, echo or cardiac MRI and absence of significant coronary artery disease.

Results: 71 patients (59 male, mean age 39±20) have been enrolled. Presenting symptoms were chest pain (77,5%), dyspnea (33,8%), cardiogenic shock (11,3%) and conduction disorder or significant arrhythmia (8,4%). ST segment or T wave changes were present in 88,7%. Mean troponin and CRP levels were 9,1±9,8 µg/l and 56±59 mg/l, respectively. Echocardiography showed a mean ejection fraction of 51±15%, wall motion abnormalities in 39%, and pericardial effusion in 18%. In 62% of cases, cardiac MRI was performed showing oedema (43%) and late enhancement (68%). Only 3 patients underwent a biopsy. Complications were congestive heart failure (22,5%) and ventricular arrhythmia (7%). Two patients died before hospital discharge. Viral origin of the AM was proven or presumed in 83% of patients, including 4 diagnosed with H1N1 flu. Treatment generally included beta-blockers, ACE inhibitors and aspirin.

Conclusion: AM affects mainly young patients whose prognosis may be compromised by severe complications. Follow-up of this registry will provide insight into the prognosis and the long-term impact of medical therapy.

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Heart rate recovery is a powerful prognostic factor in patients with chronic heart failure

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Background: Heart rate recovery (HRR) prognostic value is well established in patients with coronary artery disease but poorly documented in patients with heart failure (HF) and not established in those with advanced HF.

Methods: 144 patients with compensated HF underwent cardiopulmonary exercise testing (CPX) and were followed for a combined death/ transplantation/ hospitalization end point. Patients with advanced HF were defined as those with peak VO2≤ 14ml/kg/mn (n= 41/144; 28%). Mean age and left ventricular ejection fraction (LVEF) were 53±12 years and 29±7% respectively in all population and 58±11 years and 28±7% respectively in the advanced HF group. Ninety one percent of patients received betablockers (93% in advanced HF group). HRR at 1-minute post-CPX was calculated as the difference between heart rate at peak exercise and after 1 minute of active recovery.

Results: Among the 144 patients, we recorded 10 mortality, 7 cardiac transplantation and 8 hospitalization for acute HF outcome events over 16 months of follow-up. The baseline mean peak respiratory exchange ratio (RER), peak VO2, VE/VCO2 slope, and HRR1 were 1.13±0.09, 16±4 ml/kg/mn, 35±8, 13±12 beat/mn, respectively. Although LVEF, peak VO2, VE/VCO2 slope and HRR1 were significant univariate predictors of the composite end point ($p<0.05$), multivariate Cox regression analysis only retained LVEF (chi2 = 5.5, p=0.01) and HRR1 (chi2 = 5.2, p= 0.02) in the equation. In the group of patients with advanced HF the mean peak RER, peak VO2, VE/VCO2 slope, and HRR1 were 1.10±0.07, 12±1 ml/kg/mn, 39±11, 9±8 beat/mn, respectively. Kaplan-Meier analysis revealed a significant difference in survival according to a 5 bpm HRR1 threshold: 68% in patients with HRR1≤ 5 bpm vs 96% in those with HRR1> 5bpm (logrank=5, p=0.02) (HR= 2.66; CI: 2.08-2.66, p=0.02).

Conclusions: HRR is an easily measured noninvasive variable that can be used to further prognostically risk stratify patients with advanced HF.

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Prognostication in patients with heart failure and intermediate peak oxygen consumption values can be more accurately assessed by heart rate recovery

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Background: Patients with heart failure (HF) and peak oxygen consumption (pVO2) < 10 ml/kg/mn have a very poor prognosis whereas those with a pVO2 >18 ml/kg/mn have a very good prognosis. However, there remains a "grey zone" of intermediate pVO2 values between 10 and 18ml/kg/mn which needs to be further stratified. The aim of the study is to evaluate whether patients with intermediate pVO2 values can be more accurately assessed in terms of prognosis using heart rate recovery (HRR).

Methods: 92 patients with compensated HF with 10< pVO2≤ 18ml/kg/mn at cardiopulmonary exercise testing (CPX) were followed for a combined death/ transplantation/ hospitalisation end point. Mean age and left ventricular ejection fraction (LVEF) were 54±12 years and 30±6% respectively. Ninety one percent of patients received betablockers. Heart rate at 1-minute post-CPX (HRR1) was calculated as the difference between heart rate at peak exercise and after 1 minute of active recovery.

Results: We recorded 5 mortality, 4 cardiac transplantation and 5 hospitalisation for acute HF outcome events over 16 months of follow-up. The baseline mean peak respiratory exchange ratio (RER), pVO2, minute ventilation/ carbon dioxide production (VE/VCO2) slope, and HRR1 were 1.14±0.10, 14.7±2.0 ml/kg/mn, 36.6±8.5, 12±13 beat/mn respectively. Although LVEF, VE/VCO2 slope and HRR1 were significant univariate predictors of the composite end point ($p<0.01$), multivariate Cox regression analysis only retained the HRR1 in the equation (chi2 = 5.07, HR= 2.39, CI: 2.19-2.68, p= 0.02). Kaplan-Meier analysis revealed a significant difference in event-free survival according to a 7 bpm HRR1 cut-off: 65 % in patients with HRR1≤ 7 bpm vs 96% in those with HRR1> 7 bpm (logrank=14, p=0.0002) (HR= 2.53; CI: 2.42-2.65, p=0.003).

Conclusions: HRR1 is an easily measured noninvasive variable that can be used to further prognostically risk stratify patients with HF and intermediate peak oxygen consumption (10< pVO2≤ 18ml/kg/mn).

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Left ventricular dyssynchrony and exercise capacity in patients with hypertrophic cardiomyopathy

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Objectives: To investigate the impact of LV dyssynchrony on exercise capacity in patients with hypertrophic cardiomyopathy (HCM) and preserved left ventricular ejection fraction (LVEF>50%).

Methods: The study included 31 patients (57±14 years, 23 males) with HCM and preserved LVEF (65±8%, range 50 to 79%) without significant LV obstruction (<50mmHg) at rest. All underwent exercise testing and 2D and 3D echocardiography. LV dyssynchrony defined by the 16 segment standard deviation of time to peak longitudinal strain by speckle tracking (16SD) was compared to exercise capacity, 3D myocardial mass and LV filling pressure assessed by the ratio E/E'_{TDI} (Peak early filling velocity over peak systolic velocity by TDI).

Results: LV dyssynchrony (16SD=96±35 ms) was associated to a reduced exercise capacity (r=-0.39, p=0.035) and increased LV filling pressure (r=0.50, p=0.01). Interestingly LV dyssynchrony increased with the severity of myocardial hypertrophy (r=0.66, p<0.001) and was associated to a reduce global-strain (r=0.62, p<0.001).

Conclusion: Myocardial dyssynchrony increased with the severity of myocardial hypertrophy in HCM patients and may be involved in exercise limitation in patients without LV obstruction and preserved LVEF.

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VO2 max to measure the functional status of obese heart failure patients.

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Background: Obesity has been described as an independent risk factor for heart failure (HF). However, B-type natriuretic peptide (BNP) failed in evaluation of the severity of HF in obese patient because: i) Obese patients suffer dyspnoea earlier than non obese which leads to an earlier diagnosis an could explain lower BNP rates, and ii) BNP receptors were found on adipocytes suggesting a higher clearance of BNP in obese patients.

Purpose: Our aim was to explore the relationship between functional status of obese HF patients and BNP levels.

Method and results: In our HF registry, 249 patients with dilated cardiomyopathy (DCM) were included in 3 groups regarding their body mass index: 112 normal weighted <25 kg/m^2 (NW), 88 overweighted 25-29.9 kg/m^2 (OW), and 49 obese 30 kg/m^2 or greater (Ob) patients. We analyzed NYHA status, the 6 minutes walk test (6MWT) a simple and reliable way to assess the exercise capacity of DCM patients, and measured the peak oxygen consumption during incremental exercise (VO2 max).

There was no significant difference between the 3 groups for baseline characteristics and ejection fraction was comparable (NW: 27+/-9%; OW: 27+/-9%; Ob: 29+/-10%; p=0.26))

BNP levels were lower in the obese group (962+/-1166 in NW, 757+/-204 in OW, 353+/-608 in Ob; p=0.02). There was no significant difference between groups in distance covered in the 6MWT (NW: 370+/-98m; OW: 392+/-125m; Ob: 388m; p=0.27) and NYHA scores (NM: 2.3+/-0.7; OW: 2.3+/-0.6; Ob: 2.4+/-0.7; p=0.32), however, VO2 max was significantly lower in the Ob patients (NW: 17.4+/-7.7 ml/min/kg; OW: 16.1+/-5.0 ml/min/kg; Ob: 14.8+/-6.9ml/min/kg; p=0.04).

Conclusion: These results show that VO2 max is more useful to discriminate functional status in obese patients with DCM compared to 6MWT, NYHA scores and BNP levels. BNP in the obese likely underestimates severity of HF.

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Ability of ST/HR index and ST/HR hysteresis during exercise testing to predict significant ischemia assessed by G-SPECT imaging

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Purpose: Heart rate adjustment of exercise-induced ST-segment depression (ST/HR index and ST/HR hysteresis) has been suggested as an accurate predictor of the presence of a coronary artery disease. Its powerful predictive value for proven coronary artery stenosis is now accepted. The objective of our study was to investigate the sentitivity and specificity of computerized ST/HR index and ST/HR hysteresis to detect significant ischemia.

Methods: We used a cross-sectional analysis of exercise test and myocardial perfusion stress-rest SPECT data. The study population comprised 710 consecutive patients referred for myocardial perfusion imaging. The threshold of significant ischemia was set above 10% reversibility hypoperfusion area from entire surface of left ventricle using gated -SPECT image analysis (QGS). Diagnostic performance of ST/HR index and ST/HR hysteresis was assessed by receiver operating characteristic (ROC) curve.

Results: Crude ST/HR hysteresis showed at the same 70% specificity, a sensitivities of 56% and 57%, respectively. Diagnostic performance of ST/HR hysteresis seems slightly better than ST/HR index (AUC= .668 vs .654) with the following cut points .038 mV and 1.625 µV/ bpm. Adjusting these variables to body mass index does not improve the diagnostic performance. Combining an independant clinical judgement in the model yields a moderate increase of the diagnostic accuracy the prediction only for ST/HR index as suggested by the AUC (.688) .

Conclusions: ST/HR index and ST/HR hysteresis have a good capability to detect a significant myocardial ischemia evaluated by SPECT, which has therapeutic implications.

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Epidemiological profile, management and outcome of 1200 patients with chronic heart failure

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Introduction: Heart failure (HF) remains a frequent reason for admission and readmission to hospital and therefore represents a major public health burden. The aim of our study is to report the experience of our therapeutic unit of heart failure (TUHF), the epidemiological profile, the management and the outcome of 1200 patients with chronic heart failure (CHF).

Material and methods: The study included 1200 patients, admitted in the TUHF from May 2006 to February 2010. We included all patients with (CHF) symptomatic class II, III, or IV. All patients were evaluated clinically with monitoring of blood pressure , 6 min walk test and electrocardiogram. Two-dimensional echocardiography and laboratory tests were performed in all patients.

Results: The mean age of our patients was 64.82±12.14 years (16-100), 75% were men. Hypertension was the most frequently cardiovascular risk factor (26%) followed by smoking (22%) and diabetes (21%). Patients were mainly in NYHA class II (58%), and 27% were in NYHA class III. The average of 6 minute walk test was 121.36 ±92.74 m (10 – 630). The mean heart rate at admission was 81.13 ± 17.24 bpm. More than half of our patients had an LVEF <35% (56.91%), 31.33% had LVEF between 35-50%, and 6.33% had an LVEF> 50%. Ischemic (55.67%) and hypertensive heart disease (2.67%) remain the two most frequent etiology.
Regarding treatment; 78.33% of our patients were treated with beta-blockers, 89.08%with Angiotensin-converting enzyme inhibitors (ACEI), 50.75% with spironolactone , and 12.75% with diuretics. Resynchronization has been performed in two patients.
The optimal medical treatment has allowed a significant improvement in NYHA functional class: NYHA class II (20% vs. 58%, P= 0.037), NYHA class III (5% vs 27%, P= 0.002), a significant improvement in test 6min walk (121.36 vs 465.66 m, P= 0.0001), and a significant reduction in heart rate from 80.13 bpm to 63.12bpm (P< 0.05) on an average of 6.82± 4.18 months.

Conclusion: The creating of TUHF in our department has allowed an improving of the quality of care and an optimization of the treatment.

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